GOVERNING MARITIME TRANSPORTATION IN THE ARCTIC

by

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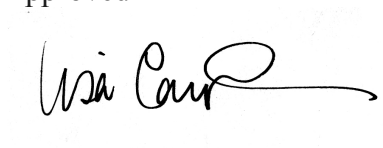

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Executive Summary

Historic observations and projected models show a trend of declining sea-ice in the Arctic as a result of global climate change. Sea-ice is the largest obstacle to Arctic maritime transportation, and given these predictions, reductions of sea-ice extent in the Arctic Ocean will create new opportunities for the global transportation industry by opening up navigable passages.

As new navigable passages and transit routes are opening up in the Arctic, one sector taking advantage of these open waters is the maritime transportation industry. Shipping is an environmentally efficient and cost-effective method for the international transportation of consumer goods, and as a result, the industry touches more than 90% of global trade. For this industry, the Arctic represents efficiencies via time and fuel saving routes and greater connectivity between major international ports. Adjacent and non-polar nations are increasing their capacity to take advantage of these new routes, many of which may prove economically advantageous for international commerce.

The dramatic transformation brought about by climate change is catalyzing a reevaluation and reorganization of global governance. Various governance regimes have emerged to manage this growing activity, including an expansion of the treaties under the International Maritime Organization and an increase in the scope of the Arctic Council. Governance actors have been tasked with managing the safety, infrastructure, and environmental impacts of Arctic transportation activities.

This paper synthesizes international, regional, and national scale governance regimes that collectively manage jurisdictional, infrastructural, and environmental issues of maritime transportation activities. The primary regimes in the Arctic are the United Nations Convention on the Law of the Sea (UNCLOS), the International Maritime Organization (IMO), the Arctic Council, national regimes, and the private transportation sector.

Drawing on contemporary understandings of governance, these governance regimes are evaluated based on seven principles of global environmental governance. Global environmental governance should:

1. Be situated in a globalized world,
2. Be appropriate for local context,
3. Be inclusive of non-state actors, especially industry,
4. Produce knowledge,

5. Provide sufficient infrastructure, including capacity for enforcement,
6. Ensure environmental protection, and
7. Be flexible and adaptable.

The above components of global environmental governance have all been identified as appropriate and relevant in the Arctic and/or for the maritime transportation industry.

Each of the existing Arctic institutions is fulfilling at least one of the governance principles, indicating that existing governance institutions successfully contribute to overall governance in the region. Yet there are still gaps that impair Arctic governance from functioning as a cohesive form of global environmental governance. Of the various governance regimes proposed by Arctic scholars to manage the changing region, I argue for an expansion of the Arctic Council that would facilitate a networked governance regime in the Arctic. A networked regime – a combination of multilevel, niche, and hybrid governance – recognizes the successful attributes of existing regimes and strives to connect them all in a network of governance to collectively and comprehensively manage the natural resources of a region.

Growing maritime transportation activities in the Arctic will face opportunities and threats associated with the environmental, political, and socioeconomic conditions unique to the region. A networked governance regime in the Arctic would effectively manage the maritime transportation industry to mitigate and minimize environmental harms while achieving the greatest resource benefits for society.

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I. Introduction

Climate change is altering the biophysical world around us. Nowhere are these changes more easily visualized than in the Arctic, an area covering the polar region of the Northern hemisphere. In the Arctic, climate change is leading to a warming of air and sea surface temperatures, resulting in dramatic impacts on the regional ecosystems (Maslowski et al., 2012). One example of this change is the overall decline in sea-ice extent. As the Arctic warms, there is a trend of decreasing sea-ice extent, leaving previously ice-covered areas of the Arctic Ocean now ice-free.

As the sea-ice extent decreases, new navigable passages and transit routes are opening up in the Arctic, and one sector predicted to take advantage of these changes is the maritime transportation industry. For this industry, the Arctic represents efficiencies via time and fuel saving routes and greater connectivity between major international ports. Transportation activities in the Arctic will face a set of opportunities and risks associated with the environmental, political, and socioeconomic conditions unique to the region (IMO, 2015). These risks need to be planned for in order to fully realize the opportunities (Emmerson & Lahn, 2012).

Responses to climate change look either to minimize greenhouse gas emissions or increase social adaptive capacity to respond to changing conditions (Lemos & Agrawal, 2006). Governance in the Arctic approaches climate change from the latter perspective, and considers how to appropriately govern in a constantly changing environment. The dramatic transformation brought about by climate change is catalyzing a reevaluation and reorganization of global governance.

A strong governance framework is needed to take advantage of opportunities in the Arctic in a sustainable manner (Emmerson & Lahn, 2012). Various regimes have emerged to manage activities, including maritime transportation, in the Arctic. This paper explores the development of some of the major governance institutions that exist and evaluates them according to principles of global environmental governance. Maritime transportation is a matter of "life and death, injury, pollution, terrorism, jobs and prosperity," and therefore needs to be effectively managed and organized (Roe, 2007, Pg. 100) to mitigate and minimize environmental harms while achieving the greatest resource benefits for society.

II. Climate Change in the Arctic

Predominately non-Arctic forces drive climate change, yet the polar latitudes are seeing the most dramatic changes (Young, 2012). Due to polar amplification, the process by which the poles experience a greater change in surface and air temperatures, the impacts of climate change are more pronounced in the Arctic, particularly obvious in the loss of perennial ice and reduced extent of the summer ice-minimum. In conjunction, the thickness of sea-ice has been decreasing; warmer air temperatures lead to surface ice melt and warmer waters lead to below-ice melt. Factors that influence sea-ice cover include changing air-sea heat fluxes and ice-albedo feedback, which in turn increases Earth's absorption of solar radiation. A decrease in sea-ice is believed to be the greatest positive feedback mechanism contributing to polar amplification (Maslowski et al., 2012).

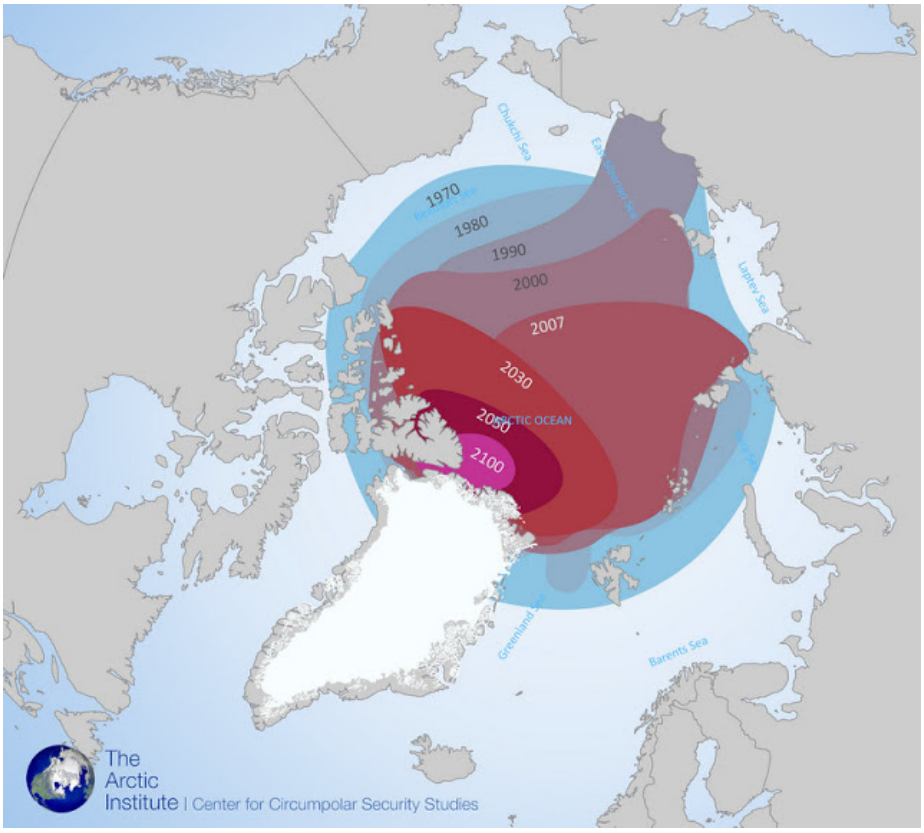

Figure 1: Decreasing sea-ice extent from historical and projected models. (Humpert & Raspotnik, 2012)

Declining sea-ice in the Arctic is an indicator of global climate change. Historical trends from satellite records between 1979 and 2010 show that the September sea-ice minimum is declining at a rate greater than 11% per decade. This rate has accelerated within the last decade

to the extent that the September minimum has been below two standard deviations of the mean ice extent (Kattsov et al., 2010). The 2007 minimum was almost 40% below the 1979-2010 average (Maslowski et al., 2012). That equates to approximately 25% loss of the total sea ice extent since 1979, and a decrease of about 100,000 km^2 per year (Boé et al., 2009). These trends are predicted to continue and accelerate in the future (Figure 1) (Smith & Stephenson, 2013).

There is a large spread and much inconsistency between modeled results of predicted ice coverage in the Arctic (Boé et al., 2009; Ho, 2010). The Intergovernmental Panel on Climate Change (IPCC) Relative Concentration Pathway (RCP) 8.5 model, the most dramatic of the IPCC models and a high greenhouse gas (GHG) emissions scenario (Riahi et al., 2011), is conservative when compared with existing literature on modeled sea-ice extent (Wang & Overland, 2012). IPCC 4.5, a medium GHG emissions pathway predicts an ice-free minimum September extent by the end of the 21st century (Boé et al., 2009). Ice-free conditions in the Arctic are defined as an extent of ice coverage less than 1 million km^2.

Global Climate Models used by the Arctic Climate Impact Assessment show a 50% reduction in summer sea-ice cover by the end of the 21st century while IPCC AR4 models and Coupled Model Intercomparison Project Phase 3 (CMIP3) project an almost ice-free summer by the end of the century (Maslowski et al., 2012). Overland and Wang predict a nearly ice-free Arctic by the 2030s (Wang & Overland, 2012). Current climate models are often more conservative than satellite data (Smith & Stephenson, 2013). Models do not include all the known global climate forcings; for example they do not include the potential warming from thawing methane in Arctic lakes (Ho, 2010) that would increase the rate of sea-ice decline.

Climate change will cause a reduction in the extent of the Arctic sea-ice minimum (Maslowski et al., 2012). The decline of the September Arctic ice minimum represents social, climatological, and ecological threats and economic opportunities (Wang & Overland, 2012). Transportation dependent on open waters in the Arctic will potentially benefit from the impacts of climate change.

III. Maritime Transportation in the Arctic

Declining sea-ice creates an opportunity for the global maritime transportation industry to utilize new trade routes. Given the predictions described above, sea-ice extent declines in the

Arctic Ocean will positively impact the global maritime transportation industry by opening up new navigable routes. Rising prices of fuel, growing markets for minerals, and interests in hydrocarbon resources have catalyzed transportation activities in the Arctic (Stokke, 2012).

Sea ice is the "single greatest obstacle to trans-Arctic shipping," but other concerns include lack of services and infrastructure in the Arctic to support the transportation industry, high insurance and escort fees, unknown response of the Suez and Panama canals that would increase their relative competitiveness, and inadequate charts to guide navigation (Smith & Stephenson, 2013). Adjacent and non-polar nations are increasing their capacity to take advantage of these new routes, many of which will be economically advantageous for international commerce.

A. New Opportunities for the Transportation Industry

Maritime transportation activities are expected to grow in volume and diversity in the coming decades (Arctic Council, 2009; Ebinger et al., 2014; IMO, 2015; Smith & Stephenson, 2013). Trans-Artic transportation provides many opportunities for the global shipping industry and major shipping nations in the region are building up their icebreaking fleets to take advantage of these opportunities (Geiselhart, 2014). Transportation between the Pacific and Atlantic via the Arctic can be up to 5000 miles and a week shorter than transit through the Suez and Panama Canals (Figure 2) (Geiselhart, 2014; Ho, 2010). This could result in a significant reduction of fuel costs and canal fees for shipping companies, saving the industry billions of dollars per year. Likewise, waters in the Arctic are deeper than the Panama Canal, allowing passage of a growing class of supertankers that have a draft too long for the canals to accommodate (Borgerson, 2008). To fully develop a shipping industry in the Arctic there will be some necessary infrastructural investments pertaining to feasibility, safety, and environmental impact of these activities (Ho, 2010).

B. Navigable Routes

The two most prominent routes through the Arctic are the Northern Sea Route (NSR), which passes over northern Russia and is also known as the Northeast Passage, and the Northwest Passage (NWP), which traverses the waters of northern Canada (Figure 2).

September is the month where transit through the Arctic is most likely, as that is when sea ice is at its minimum. Modeled ice distribution indicates that open-water vessels will be able to transit sooner through the NSR, while passage through the NWP would be more likely to necessitate ice-strengthened vessels in the foreseeable future (Smith & Stephenson, 2013). According to a survey of various climate models, there is an increasing feasibility of open water (unstrengthened) vessels to transit the Arctic along the Northern Sea Route (NSR) increasing in frequency and expanding geographically by 2040-2059. The Northwest Passage (NWP) currently has much less navigability due to ice density than the NSR, but will become increasingly more open and accessible by the 2040-2059 period. The NWP is always a more efficient Arctic passage for any ice-strengthened vessels transiting from any ports along eastern North America. These are predictions made by climate models, which are often quite conservative when compared to reality of sea ice extent and thickness (Boé et al., 2009; Smith & Stephenson, 2013).

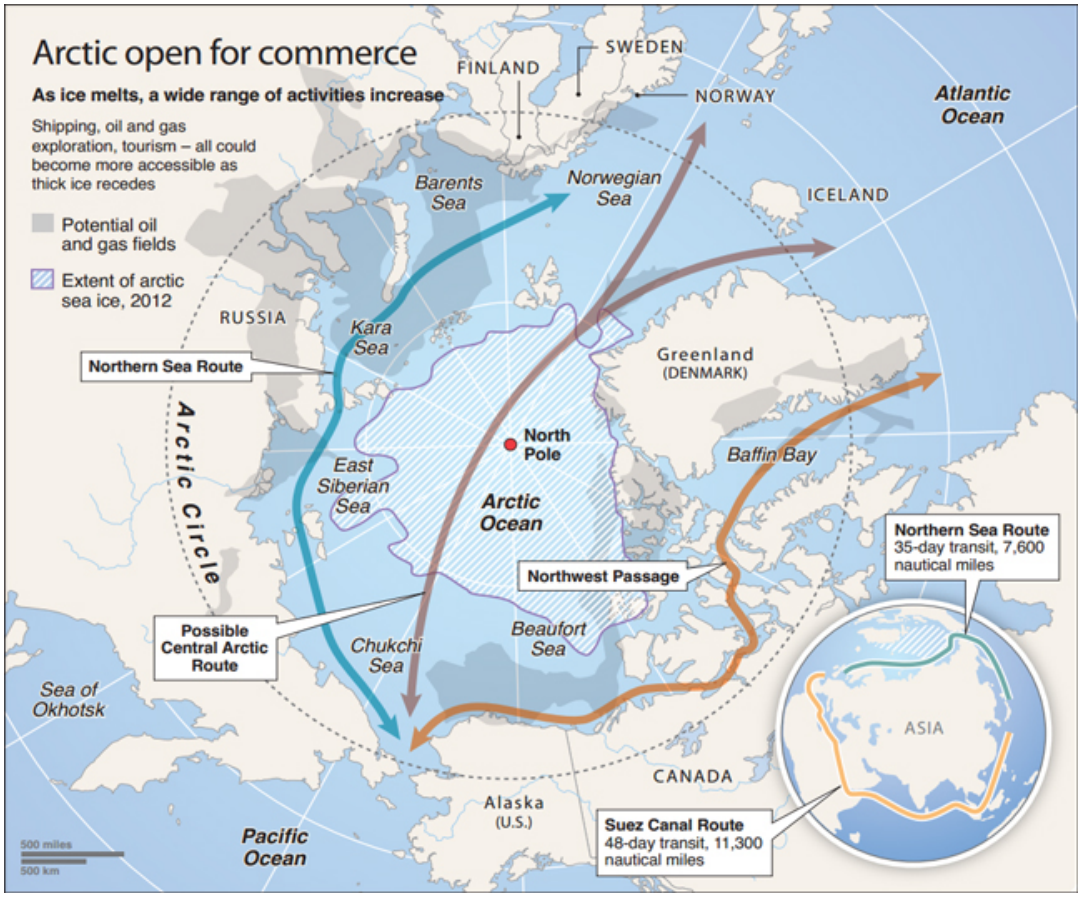

Figure 2: Navigable sea lanes in the Arctic. Inset map shows relative comparison of journey with a route through the Suez Canal. (CNA, 2014)

Routes along the coast of Serbia and parts of the NSR are expected to be navigable much earlier than the NWP. In 2007, 2.13 million tonnes of cargo were transported through the Arctic along the NSR (Ho, 2010). Non-Russian vessels first started accessing the NSR in 2004 and the first ice-free trans-Arctic transit occurred in 2008 (Ho, 2010). The first commercial voyages were made in the NSR in 1997, but by 2011 only four ships had made the transit. In 2013, 71 commercials ships transited across the Arctic using the NSR, a dramatic increase from past years (Thomson, 2014). For comparison, approximately 19,000 vessels utilize the Suez Canal each year (Palmer, 2013).There is much potential for increasing transportation activities in the Arctic as the length of the season increases with a warming Arctic (Geiselhart, 2014). With melting sea-ice, there is also an overall increase in the number of navigable days. Currently, there are 50 navigable days in the Arctic, but by 2050, the IPCC predicts as many as 125 navigable days via the NSR (Larsen et al., 2014). Since IPCC climate predictions are on the conservative side, it can be imagined that this number may be much greater by 2050.

The Arctic Marine Shipping Assessment (AMSA) (Arctic Council, 2009) is conservative regarding trans-polar transportation, predicting that much of the activity will be dominated by increasing regional transportation within the Arctic, directly adjacent. There has also been increased regional traffic centralized around areas of new hydrocarbon resource development, de facto shuttle services between offshore rigs and their onshore support infrastructure (PAME, 2013). The AMSA predicts that coastal and port access and infrastructure will all be improved in these areas. Ho proposes that what is more likely is that there will be an increase in foreign research, merchant vessels through the NSR (Ho, 2010). The sector of transportation also influences interest in Arctic transit. A survey by Lasserre and Pelletier (2011) showed that container vessels were not interested in Arctic passage. Similarly sectors that were constrained by timing, or operated on a “just in time” schedule like RoRo (roll on roll off vessels), could not risk possible delays in the Arctic due to ice conditions (Lasserre & Pelletier, 2011). In their survey, regional shipowners did show a greater interest in Arctic activities (Lasserre & Pelletier, 2011), confirming other findings that local traffic is predicted to grow.

The majority of the literature assumes that transportation through the arctic will increase because there is the assumption that a shorter route is more desirable (Lasserre & Pelletier, 2011). In contrast, Lasserre and Pelletier found a lack of enthusiasm for Arctic shipping among shipowners who had potential to operate in the Arctic. They argue that there are many

assumptions in the economic assessments of Arctic transportation and therefore the stated theoretical advantage is uncertain due to other financial and infrastructural investments necessary to enable Arctic transportation.

Risk and cost were some of the reasons shipowners were not interested in expanding into Arctic transportation. Lasserre and Palletiere (2011) found that perception and persistence of risk was a common factor for why shipowners were hesitant to invest in Arctic transportation. These risks include the uncertainty of ice extent, lack of port facilities and navigational aids, inaccuracy of charts, and inadequate emergency response centers (Stokke, 2012). Insurance policies require ice-strengthened ships, while owners are uncertain that these are still necessary. Other costs include the need for temperature controlled containers or vessels to prevent cargo from freezing (Lasserre & Pelletier, 2011).

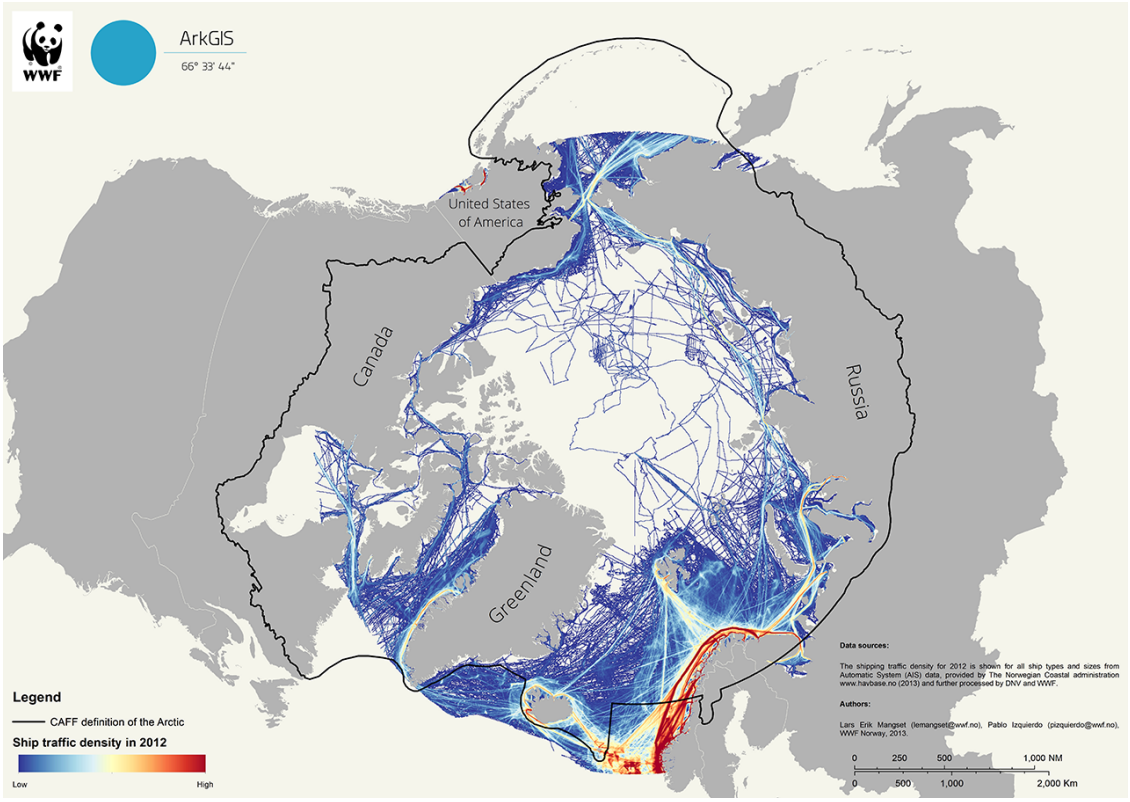

Figure 3: Ship traffic density in the Arctic in 2012 as determined from AIS vessel tracking system. Although the CAFF definition of the Arctic is delineated, the tracks are constrained to within the Arctic Circle. (Magnset & Izquierdo, 2013)

C. Environmental Impacts of Increased Transportation Activities

Although shorter shipping routes will result in environmental gains, including a decrease the amount of fossil fuels used by the industry, there are potential negative environmental

impacts for the Arctic. These include increased black carbon deposition, noise in marine habitats, discharge of wastewater, introduction of invasive species, and the potential for an oil spill. These threats are compounded because the ability of the Arctic ecosystem to withstand and rebound from environmental disasters is weak (Emmerson & Lahn, 2012).

The most common environmental impacts from increased ship operation in the Arctic are projected to be bunker fuel spills and exhaust emissions (Geiselhart, 2014). One exhaust emission is black carbon, the soot from fossil fuel burning that when deposited on sea-ice could decrease local albedo and increase melting of sea-ice, having a direct impact on global climate forcings (Browse et al., 2013). Browse et al., (2013) model that the dominant source of black carbon deposited in the Arctic will be actually be non-vessel sources south of the Arctic Circle (Browse et al., 2013; Quinn et al., 2008). Therefore, although vessel-based emissions will more than double under high transit projections, less than 1% of black carbon aerosol is predicted to come from vessels transiting in the Arctic in 2050.

For vessels in transit, there is significant ambient noise generated by the engines and propellers. This noise has the ability to impair behavior and communication of marine animals. With increasing ship traffic, there will be a greater magnitude of noise, and greater duration of noise as the length of the possible transit season expands. A study on icebreaker noise in the eastern part of the NWP showed that the noise was perceptible to belugas and narwhals in excess of 25 to 30 km away from the ship, and could potentially alter their behavior (Aguilar Soto et al., 2006). A computer model of icebreaker noise indicated that vessel noise could mask beluga communications between 14 and 71 km and even cause temporary hearing damage in the animal if it is as close 4 km to the ship (Erbe & Farmer, 2000).

Sewage and graywater discharges from vessels present a potential threat from the introduction of nutrients that can disrupt the balance of Arctic marine ecosystems. Sewage is water produced from toilets, whereas graywater is water from laundry, showers, and sinks. Increased nutrients, like nitrogen and phosphorous, from these wastewaters can lead to over-enrichment of the water column, potentially causing harmful algal blooms and eventually hypoxic dead zones. Changes to the nutrient balance could have negative implications for Artic food webs (ASOC, 2013).

As a result of the international nature of the shipping industry, vessels crossing the Arctic will originate from many different regions around the world. These vessels can be host to a

variety of invasive species, like the larvae of mussels of barnacles that can be transported either via ballast water or hull fouling (Palmer, 2013). These invasive species have the potential to overrun the more delicate native marine species and disrupt Arctic food webs. The cold temperatures of Arctic passages may be conducive to the survival of invasive species that normally would have died in the hotter, tropical conditions of passages through the Suez or Panama canals. Shipping is the source of 69% of invasive species introduced into marine ecosystems, the greatest cause of marine invasive introductions (Palmer, 2013).

The most devastating environmental catastrophe in the Arctic would be an accident like the Exxon-Valdez spill (Geiselhart, 2014). The potential environmental impacts would be significantly compounded in the Arctic than if a similar disaster were to occur elsewhere because of the complexity and high cost of response and clean up (Emmerson & Lahn, 2012).

IV. Global Environmental Governance

A. Defining Governance

Governance is not defined by any one political structure, rather it encompasses the political economic relationships of institutions and the way these relationships influence identities, actions, and outcomes (Lemos & Agrawal, 2006). Lemos and Agrawal (2006) define governance as "a set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes." Young (2012) defines governances as a "social function involving the establishment and administration of assemblages of rights, rules, and decision making procedures intended to steer socio-ecological systems toward pathways that are collectively desirable." Socio-ecological systems combine anthropogenic and biophysical factors. Institutions are defined as "sets of rules, decision-making procedures, and programmatic activities that serve to define social practices and to guide the interactions of those participating in these practices." International regimes address a specific issue and are composed of institutions where the nation-state is the main actor (Stokke, 2012). As a result, environmental governance is variable in form (Lemos & Agrawal, 2006).

Governance is not the same as government. Governance actively involves actors beyond the state, such as communities, businesses and nongovernmental organizations (Lemos & Agrawal, 2006) and can involve informal rules and management of natural resources and space

(Rothwell & Stephens, 2010). Governance is "a mode of governing that is distinct from the hierarchical control model characterizing the interventionist state. Governance is the type of regulation typical of the cooperative state, where state and non-state actors participate in mixed public/private policy networks" (Mayntz, 2002). When considering the maritime transportation industry, governance often includes shipowners, cargo owners, and insurers of the goods or the vessels (Arctic Council, 2009).

These definitions set the stage for a form of management that integrates distinct institutions and many stakeholders across multiple spatial and hierarchical scales to sustainably manage natural resources and space. Based on these definitions, it is possible to propose a multifaceted solution to Arctic governance in Part VII that recognizes many different forms of governance and allows them to function together in a complementary and cohesive manner.

B. Principles of Effective Global Environmental Governance

Scholars of governance have identified the subsequent principles of environmental governance as necessary for managing global natural resources. These principles are all appropriate for managing maritime transportation and the Arctic Ocean.

Situated in a Globalized World

With increasing globalization, there is a need for governance to be situated in the global setting. Globalization refers to the linkages across the environment, society, and economy. Governance cannot be developed independent of global forces because of the influences of global climate change and the increasing interconnectedness through globalization (Geiselhart, 2014).

"The problems of ocean space are closely interrelated and need to be considered as a whole" (UNCLOS, 1982), and thus the argument for global environmental governance is that environmental problems cannot be managed by any one nation state. Historically, this has meant that the nation state is the appropriate actor in global cooperation and international arrangements that have developed to address environmental problems (Lemos & Agrawal, 2006). Arctic governance must recognize its global context because the environmental changes the Arctic is facing due to climate change are a result of predominately non-Arctic forcings.

Globalization can have positive and negative impacts on governance. Economic globalization leads to impacts on the environment at multiple scales, for example by intensifying demand for global goods, increasing pollution, and putting resource strain on the nation-state. On the positive side, globalization enables a freer flow of information. Globalization also empowers actors that previously would not have had a role in government; these actors are considered to be "networks of knowledge-based expertise (Lemos & Agrawal, 2006)."

The shipping industry is inherently part of the globalized world due to the international nature of its business. Shipping has been described as "an international tool in the service of global trade. (Arctic Council, 2009)" One vessel traversing one route can travel multiple national and international jurisdictions, and be host to a crew representing multiple nationalities (Roe, 2007). Shipping governance is often an attempt to encourage "harmonization and uniformity" across international maritime law (Arctic Council, 2009).

Appropriate for Local Context

While it is important to situate governance in the global context, it is equally important to implement governance that is tailored to unique local conditions. Young identifies one of the limitations of effective governance to be the lack of consideration for local biophysical and socioeconomic systems (Young, 2012). The local context refers to the biophysical, socioeconomic, and political conditions that are unique to the Arctic region. On a practical level, policy is often created at the national or international level and then implemented at the local level. Policy implemented at the local level is more desirable because the implementation is cognizant of local needs and constraints and can therefore be tailored for a more successful outcome (Roe, 2007).

This principle is not inherently in conflict with the first because of "scale-matching." Environmental problems cannot be solved on any on single scale. Therefore although issues like climate change require global action, there are cases in which local response in appropriate. The most appropriate scale of governance is one that contributes the most relevant information, and can respond quickly, and is able to address issues across multiple scales (Costanza et al., 1998).

Maritime transportation activities face a unique set of challenges in the Arctic, including traversing ice-covered passages, facing hurricane-strength storms, and being in physical remote locations that make the Arctic a more dangerous than traditional open ocean routes (Ebinger et

al., 2014). Although it is important to situate transportation governance on the international scale as ships passing through the Arctic must pass through multiple national jurisdictions, the governance of shipping must include recognition of the local-scale context to manage risk and adequately prepare for Arctic conditions.

In the context of the Arctic, local can also refer to the recognition and incorporation of local and indigenous communities living in the region. The more global the form of governance, the lesser the role is for participation by local constituents. Thus there are trade offs between managing environmental problems at the global level and including appropriate participants at the local level (Moss & Newig, 2010).

Inclusive of Non-States Actors, Especially Industry

Failure of state-centered international governance has led to governance that actively includes non-sate actors who had been previously excluded from the policy process: the private sector, social movements, and nongovernmental organizations. Due to the multifaceted nature of global environmental problems, these non-state actors may be appropriately situated to influence the sources of these problems by mobilizing public opinions and developing innovative solutions (Lemos & Agrawal, 2006). The Aarhus Convention explicitly states that "environmental issues are best handled with the participation of all concerned citizens, at the relevant level" (Rothwell & Stephens, 2010). As new actors become participants in global governance, there is a diffusion of political power and authority over environmental management (Haas, 2004).

Governance in the Arctic needs to be inclusive of non-state actors, actively including industry into policy formulation and decision-making. Neoliberal policy has shifted governance towards private actors and market-based mechanisms (environmental taxes, voluntary agreements, self-regulation, etc.) since the 1970s. Voluntary agreements are created so that actors may meet environmental targets, for example lower sewage and graywater discharge (Lemos & Agrawal, 2006).

There is an increasing role of the private sector in the shipping industry. Private capital is becoming increasingly prevalent and replacing state-owned maritime assets, such as vessels or and port infrastructure (Roe, 2007). Market-based governance assumes behaviors in which consumers who have a concern for the environment sway industry. The success of private environmental governance depends greatly on the ability of the private actors to internalize

environmental protections among their stakeholders. An example of successful inclusion of industry into the governance process is the Malacca Straits Cooperative Mechanism, an agreement led by nations but that included industry (Ho, 2010). Limitations of successful private governance include concerns over potential loss of economic competitiveness (Lemos & Agrawal, 2006).

Produce knowledge

The presence of adequate knowledge is a basic characteristic that either enables or limits maritime transportation activities. Governance should ensure the production of knowledge and that knowledge will contribute to safe and reliable maritime transportation.

Risk management is a critical component of managing risks associated with transit opportunities, but doing so requires the most accurate and up to date information (Emmerson & Lahn, 2012). Practical limitations to maritime transportation activities in the Arctic include a scarcity of information that would allow for safe passage and an absence of adequate response infrastructure in case of an emergency.

There is currently inadequate ecological information for appropriate decision making and inadequate training for crews operation in the region (Eamer et al., 2013). There is an "infrastructure deficit" in the Arctic; only 5% of the Arctic is adequately charted for safe navigation, whereas as seen in Figure 3, a significant portion of the Arctic is already experiencing sustained traffic (Mangset, 2014). There is a need for increased availability of technical information on environmental (weather, sea, atmospheric) conditions to operate safely in polar conditions (Emmerson & Lahn, 2012).

Provide sufficient infrastructure, including capacity for enforcement

Another necessity for maritime transportation is the presence of infrastructure to ensure safe and environmentally conscious activities. Climate and ice projections will have implications for the type of infrastructure that needs to be developed. With increased availability of environmental data, there is also a need for greater physical infrastructure in the Arctic including new technology like higher class icebreakers capable of operating in icy conditions, aids to navigation, and local ports (Ho, 2010; IMO, 2015). Use of Arctic passages within the first half of the 21st century will require construction of higher-class ice-strengthened vessels and ice

breakers as will the decision to utilize the NSR versus the NWP. Waiting towards the end of the century, when there is a lesser-predicted extent of sea-ice, to utilize Arctic routes may lessen the extent to which vessels need to be fortified against the ice (Smith & Stephenson, 2013). A significant part of infrastructure is the capacity to enforce Arctic policy. It will be necessary to ensure compliance with environmental regulations to maintain the fragile ecosystem.

Ensure environmental protections

While neoliberal policy has been influential in modifying the focus of global environmental governance, it has not led to a form of governance driven by private agendas. In actuality, the increased role of private actors in governance has led to a greater concern for global environmental problems (Bernstein, 2002).

Global environment governance should ensure protection of the Earth's natural resources. Environmental governance in the Arctic needs to be proactive rather than reactive. An environmental catastrophe could wreak irreparable havoc on the unique ecosystem of the Arctic, and therefore it is imperative that governance look to mitigate damages to the maximum extent possible (Arctic Council, 2009). In the face of uncertainty in the Arctic, stakeholders should adopt the precautionary principle, and be conservative with their actions to minimize potential impacts (Costanza et al., 1998).

Flexible and Adaptable

Governance of natural resources should be flexible and adaptable to respond to dynamic changing environmental, political and social conditions (Costanza et al., 1998). This uncertainty makes governance difficult, and a politically and financially costly process to evaluate (Lemos & Agrawal, 2006). A flexible and adaptable regime would require deliberate approaches to uncertainty and increase capacity for rapid response (Young, 2012). An adaptable regime can have two approaches: a) adaptive, where governance response to changes as they are occurring, or b) anticipatory, governance that emphasizes changes that are expected to occur in the future (Young, 2012). These approaches are not mutually exclusive.

In the Arctic, governance needs to be capable of working with uncertainty of the changing environments and consequences due to climate change. This involves managing actual and perceived environmental risk (CAFF, 2013; Eamer et al., 2013).

V. Defining the Arctic

Part of the complexity of managing the Arctic emerges from the problem that there is no one definition of the Arctic (Table 1), and existing governance bodies are managing disparate spatial areas. The most simplistic definition is one that considers the Arctic to be all land and sea north of the Arctic Circle at 66° N (Figure 5). Arctic countries consider the boundary to be the 60° N parallel. The latter definition covers a land and sea area of 30 million square kilometers (Geiselhart, 2014). Various bodies delineate the Arctic differently based on the needs of their programs; other natural boundary features include the 10°C isotherm, the treeline because it represents the boundary between forest and tundra, or the isohaline between the cool marine waters of the Arctic Ocean and the warmer, more saline waters of the Atlantic (AMAP, 1998).

These distinct definitions have implications for the extent of governance. For governance that appropriately considers the maritime transportation industry, the boundary definition of the Arctic needs to consider the geophysical reality of the Arctic environment and must include all waters that comprise similar polar transit conditions. This is necessary to ensure that uniform standards are applied across the region. The most appropriate definition for governing shipping is therefore that proposed by AMAP, as it encompasses areas below the Arctic Circle, including the Alaskan Aleutian Islands, an area of significant, but high risk, maritime transportation.

Table 1: Formal definitions of the Arctic.

Source	Definition	Graphical Representation
International Maritime Organization (IMO, 2009)	Arctic waters means those waters which are located north of a line extending from latitude 58°00'. N, longitude 042°00'.0 W to latitude 64°37'.0 N, longitude 035°27'.0 W and thence by a rhumb line to latitude 67°03'.9 N, longitude 026°33'.4 W and thence by a rhumb line to Sørkapp, Jan Mayen and by the southern shore of Jan Mayen to the Island of Bjørnøya and thence by a great circle line from the Island of Bjørnøya to Cap Kanin Nos and thence by the northern shore of the Asian continent eastward to the Bering Strait and thence from the Bering Strait westward to latitude 60° N as far as Il'pyrskiy and following the 60th North parallel eastward as far as and including Etolin Strait and thence by the northern shore of the North American continent as far south as latitude 60° N and thence eastward along parallel of latitude 60°.N, to longitude 56°37'.1 W and thence to the latitude 58°00.0' N, longitude 042°00'.0 W	 Figure 4: IMO Definition of the Arctic. (IMO, 2009)

Arctic Monitoring and Assessment Program (AMAP), A Working Group of the Arctic Council (AMAP, 1998)	AMAP has defined a regional extent based on a compromise among various definitions. The 'AMAP area' essentially includes the terrestrial and marine areas north of the Arctic Circle (66°32'N), and north of 62°N in Asia and 60°N in North America, modified to include the marine areas north of the Aleutian chain, Hudson Bay, and parts of the North Atlantic Ocean including the Labrador Sea	 Figure 5: Boundaries of multiple definitions of the Arctic. (Lantuit, 2011)
United States Government ("Commerce and Trade Chapter 67 - Arctic Research and Policy," 2013)	The term 'Arctic' means all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain.	

VI. Existing Management, Policy, and Governance in the Arctic

International, regional, and national scale governance regimes have emerged to manage the growing development in the Arctic. Governance actors have been tasked with managing the safety, infrastructure, and environmental impacts of Arctic transportation activities. On the most basic level, jurisdiction in the Arctic is defined by the United Nations Conventions on the Law of the Sea (UNCLOS). New regimes emerging to provide regional guidance for activities in the Arctic include an expansion of existing treaties under the International Maritime Organization (IMO) through the Polar Code and increasing scope and capacity of the Arctic Council. There is an increasing presence of non-state actors in the Arctic to provide further guidance on management of industry activities. In this section, each of the existing regimes for the management of Arctic maritime transportation are described and then assessed according to the global environmental governance principles outlined in Section IV.

A. Law of the Sea

The United Nations Convention on the law of the Sea (UNCLOS) is considered to be the "constitution of the oceans." The convention divides up the ocean into national and international jurisdictions and, as related to shipping, defines appropriate legislation and enforcement over maritime transportation occurring in these jurisdictions (Arctic Council, 2009).

The first interaction between UNCLOS and the maritime transportation industry in the Arctic is the designation between flag states and coastal states. The priority of coastal states is to ensure environmental protections and enforcement of national policies whereas flag states desire freedom of navigation (Arctic Council, 2009). Flag states refers to the nation under which a vessel is registered. The state in which a vessel is registered has the right to enforce standards upon ships of its nationality (UNCLOS, 1982).

Coastal states adjacent to Arctic waters have jurisdiction out to 200 nautical miles from their shorelines. The zones in this area include internal waters, territorial sea, the contiguous zone, the exclusive economic zone (EEZ), and extended continental shelf where applicable, and each of these zones have respectively decreasing levels of coastal state jurisdiction. Six nations have EEZs that extend into the Arctic Circle (Figure 6). Coastal states have the responsibility to designate sea lanes and traffic separation schemes as they see fit in their territorial sea under

Article 21, especially where tankers, nuclear-powered vessels, and any vessel carrying hazardous materials is concerned (UNCLOS, 1982).

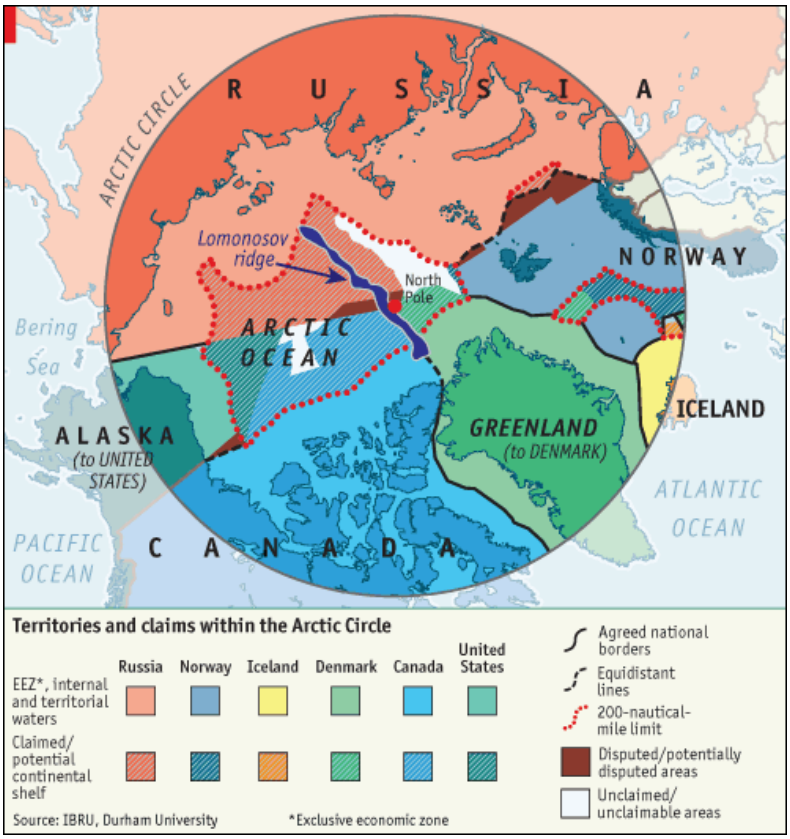

Figure 6: Exclusive economic zones and extended continental shelf claims in the Arctic. ("Suddenly, a wider world below the waterline," 2009)

Marine environmental protection is outlined in Part XIII of UNCLOS, clearly stating that all "States have the obligation to protect and preserve the marine environment" (UNCLOS, 1982). As pertinent to shipping, in EEZs, coastal states may only designate pollution prevention and control regulations within their EEZs (Arctic Council, 2009); these standards cannot be stricter than the those set by the IMO because they impair freedom of navigation. Nations can only enforce vessel-based pollution incidents when there is a "substantial discharge" (UNCLOS, 1982).

Extended continental shelf claims only provide sovereign rights over the seabed, and are driven by mineral and hydrocarbon prospecting ("Suddenly, a wider world below the waterline," 2009). Canada, Denmark, and Russia have all made claims on the Lomonosov Ridge, as illustrated in dark blue in **Error! Reference source not found.** (Geiselhart, 2014). Russia went as far as to place a titanium Russian flag on the subsea in the area of its claim (Kolcz-Ryan, 2009).

The United States is not a signatory to the Law of the Sea Convention although it voluntarily complies with the majority of its provisions. Ratifying UNCLOS is considered one of the best ways to protect US interests in the Arctic (this argument often is for securing access and rights to energy and mineral resources) (Kolcz-Ryan, 2009). If the US does not ratify UNCLOS, it cannot be a part of discussions regarding seabed mining and extended continental shelf claims in the Arctic (Admiral Papp, 2014). Similarly, becoming a signatory would codify the US' right

to enforce security in the Arctic along the nation's extensive coastline and the jurisdictional boundaries defined in UNCLOS (Kolcz-Ryan, 2009).

Under UNCLOS, Russia claims the NSR to be under its primary jurisdiction because of claims of historic use of those waters. This allows Russia to establish rules of conduct and even collect fees for transit by non-Russian vessels (described further in detail in Part VI, Subsection 4). In contrast, The United States considers the NSR to be an international strait as defined under Article 37 of UNCLOS, which would then allow for freedom of transit allowed under High Seas freedoms. The US is the only nation that continues to challenge Russia's claim to Arctic waters, most likely the result of post-Cold War relations (Rossi, 2014). Despite political conflicts with Russia in other realms, many representatives of Arctic nations see the Arctic as a potential for collaboration with Russia because the Russian Federation has been very proactive in engagement in Arctic governance (Admiral Papp, 2014; *Arctic 2014: Who Gets a Voice and Why it Matters*).

Evaluation based on Governance Criteria

Situated in a Globalized World

Multilateral agreements like treaties through UNCLOS and the IMO (discussed below) are beneficial because they are legally binding for all signatories, encouraging standardized practices across the globe. This is particularly important for the maritime transportation industry because any route through that Arctic passes through multiple national jurisdictions (Admiral Papp, 2014).

Appropriate for Local Context

A criticism of UNCLOS in regulating the Arctic is that its scope is so broad and many of the terms are so ambiguous that it does not meet the regulatory and governance needs specific to the Arctic. The only section of UNCLOS specifically related to polar regions is Article 234 in Section 8: Ice Covered Areas[1] and it only applies to ice-covered areas within a coastal state's

[1] Article 234: Coastal States have the right adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence. (UNCLOS, 1982)

EEZ (UNCLOS, 1982). This article gives coastal states significantly greater oversight than regarding a regular EEZ and recognizes the difficulties for safety and potential environmental ramifications of transportation activities in the region. Article 234 may decrease in relevance with the increasing impacts of climate change, because receding sea-ice extent implies less area that may be regulated under Article 234 (Johansson & Donner, 2014).

Inclusive of Non-State Actors

Only state delegations were involved in the formulation of the Law of the Sea (Rothwell & Stephens, 2010).

Produce Knowledge

UNCLOS does not produce knowledge.

Provide Sufficient Infrastructure, including capacity for enforcement

UNCLOS defines the parties that have the right to enforce governance of the Arctic, but does not provide capacity to do so. It similarly designates the responsibilities of port states, but provides no resources to increase infrastructure capacity.

Environmental Protections

Environmental protections under the Law of the Sea are primarily prescriptive and not enforceable by Coastal States, but there is limited enforcement jurisdiction under Article 21. There are specific "obligations" to protect the marine environment and at the time of its implementation, UNCLOS marked a shift from primarily jurisdictional marine issues to concern and management of environmental marine issues (Rothwell & Stephens, 2010).

Flexible and Adaptable

The process of creating, drafting, and approving UNCLOS took multiple decades, and even longer for the convention to enter into force. Because so many nations are party to the convention, verbiage is intentionally vague. Overall, this makes UNCLOS, and other similar internationally binding treaties very inflexible.

B. International Maritime Organization

Due to the international nature of the maritime transportation industry, ownership, management, and scope of ships can cover many jurisdictions. The establishment of the International Maritime Organization (IMO) stemmed from the need to regulate maritime transportation standards on an international level. IMO is a specialized, technical agency of the

United Nations and is responsible for the safety and security of shipping and the prevention of marine pollution by the industry (IMO, 2015). The mission statement for the IMO, as stated in their 2012-2017 strategic plan is:

> to promote safe, secure, environmentally sound, efficient and sustainable shipping through cooperation. This will be accomplished by adopting the highest practicable standards of maritime safety and security, efficiency of navigation and prevention and control of pollution from ships, as well as through consideration of the related legal matters and effective implementation of IMO's instruments with a view to their universal and uniform application (IMO, 2015).

The IMO was formally established by Convention at an international conference in Geneva in 1948 and entered into force in 1958. It was the first international body dedicated exclusively to maritime affairs. The IMO's primary concern at time of establishment was international safety regulation and its first major achievement was the International Convention for the Safety of Life at Sea (SOLAS) in 1960. But in the 1960's, marine environmental concerns came to the forefront and the IMO began to develop regulation to minimize marine pollution. The Torrey Canyon oil spill of the coast of England in 1967 catalyzed IMO's action in this field.

In 1973, the foundation piece of marine environmental regulation was established: the International Convention for the Prevention of Pollution from Ships. A 1978 protocol modified and absorbed the 1973 Convention and the resultant body of regulations is known as MARPOL 73/78. It entered into force in October 1983. Since 1978, MARPOL 73/78 has been amended and expanded to cover new pollutants. MARPOL not only covers pollution from oil spills, but also provides framework for pollution from chemicals, goods in packaged form, sewage, garbage and air pollution (IMO, 2015). The committee that is responsible for the IMO's regulations in the prevention and control of pollution from ships is the Marine Environmental Protection Committee.

The IMO has adopted a comprehensive body of successful international conventions, protocols, and codes influencing almost every part of the transportation industry, including safety, environmental issues, legal concerns, technical cooperation, maritime security, and shipping efficiency (USCG, 2014). The IMO will also adopt codes that aren't binding for the participating governments, but provide guidance in framing national regulations. It is even looking towards market-based measures that would complement a regulatory regime for the management of vessel-based greenhouse gas emissions (IMO, 2015). It is the responsibility of national

governments to implement the international standards adopted by the IMO, but the IMO will provide technical support to developing countries that are having difficulty adopting the IMO regulations. The flag state of the ship has ultimate responsibility for ensuring that its vessels meet standards, but port state control exists to catch that ships that escape proper flag state inspections (USCG, 2014).

Polar Code

The International Code for Ships Operating in Polar Waters, Polar Code for short, provides international regulations regarding safety and the environment for vessels operating in polar waters, both Arctic and Antarctic under the auspices of the IMO. It is the first mandatory legislation for vessels oeprating in polar conditions. Smith & Stephenson (2013) call for mandatory regulatory framework in the Arctic by the IMO to ensure environmental, safety, search and rescue standards. Because "supra-polar" routes can deviate outside of EEZs, there is need for cohesive international regulation.

The IMO has four major committees; of importance in the Arctic are the Martime Safety Committee (MSC) and the Marine Environmental Protection Committee (MEPC) (Arctic Council, 2009). The Polar Code is being implemented through amendments to two major conventions of the IMO, SOLAS and MARPOL, as decided through meetings of the MSC and MEPC (IMO, 2015).

Certification will be required to operate in polar waters. Certification would classify ships into three categories defining which conditions they could operation under: (A) medium ice, (B) thin first-year ice, or (C) open water or less severe ice conditions. The safety amendments fall under three general categories: design and construction of the vessel, operations and manning by the crew, and requirement of protective equipment. For example, under design and construction, vessels are required to be appropriately ice-strengthened for the type of conditions they tend to operate in, and be constructued of materials able to withstand polar temperatures. Under operations and manning, all vessels are required to have a manual on operating in polar waters and crew shall have training in navigational watch in polar conditions (IMO, 2015).

Final ammendments to SOLAS were approved in the November 2014 MSC meeting. Draft environmental protections under MARPOL were approved in the MEPC meeting in October 2014 and are expected to be approved in May 2015. The amendments for polar activity

under SOLAS and MARPOL are expected to enter into force on January 1, 2017 for new vessels, and all previously constructuted vessels are expected to meet SOLAS requirments by January 1, 2018 (IMO, 2015).

Evaluation based on Governance Criteria

Situated in a Globalized World

Global maritime transportation standards are established on the international level (Arctic Council, 2009). Broadly for the industry, the IMO has been successful in establishing policy related to international safety, environment, and security for the maritime transportation sector. This policy is then implemented by lower jurisdictional layers, such as regional or national governments (Roe, 2007). Like with UNCLOS, these standardized practices make international transportation activities smoother, although because these standards are implemented and enforced by federal governments, interpretations of practices may vary from nation to nation.

Appropriate for Local Context

The Polar Code is the IMO's response to providing context specific regulation for the Arctic. Because of the broad scope of IMO overall, multilateral agreements like the Polar Code are emerging to fit governance gaps in Arctic-specific management (Geiselhart, 2014).

Inclusive of Non-State Actors

Today the IMO is composed of 170 member states and three associate member states. The entire assembly meets every two years, but the council, composed of 40 member states, acts as IMO's governing body between assembly sessions (IMO, 2015). Each member state is composed of a national delegation representing the interests of that state.

There are also a large number of intergovernmental organizations that hold observer status at the IMO. Formally this means that these organizations have agreements of cooperation with the IMO. There are also nongovernmental organizations, which have a consultative status at the IMO, and these organizations are predominately industry organizations (IMO, 2015). These organizations often represent the interests of the maritime transportation industry, including the cruise subsector.

Produce Knowledge

The IMO is well recognized as the body to generate international standards regarding all components of the maritime transportation industry, from safety to environmental protections.

Provide Sufficient Infrastructure, including capacity for enforcement

The Polar Code does not address the infrastructure deficit in the Arctic that is a major barrier to safe Arctic development, nor does the IMO have purview over port development and other necessary infrastructure developments. The Polar Code still allows for non-ice strengthened ships to operate in polar waters. This is a concern because many believe non-ice strengthened ships are inadequate for Arctic transits (Haun, 2014).

Environmental Protections

While the IMO is well reputed in establishing environmental protections and provides fairly strict environmental provisions through SOLAS and MARPOL, the response to the Polar Code by the environmental community is that it is weak and insufficient, especially concerning the environment. The environmental community is particularly concerned about the failure to phase out the use of heavy fuel oils in the Arctic, even though this is banned in Antarctica[2] (Haun, 2014; Thomson, 2014). No guidelines for reducing the dangers of Arctic oil spill are implemented, even though this was identified as the most possible damaging environmental catastrophe in the arctic by the Arctic Marine Shipping Assessment (Mangset, 2014). The Polar Code does have regulations concerning marine mammal habitat, but provides no similar guidance for seabirds (Haun, 2014).

[2] Many scholars cite the Antarctic regime as a potential model for comprehensive governance in the Arctic. In reality, there are many differences in the biophysical, political, and socioeconomic conditions between the two polar regions that result in Antarctic governance being inappropriate for the Arctic (Duyck, 2011; Johansson & Donner, 2014).

There are geographic differences that make management of the two polar regions distinct from each other. The Arctic is experiencing the impact of climate change more dramatically than the Antarctic (Geiselhart, 2014). The Arctic is an ice-covered ocean bordered by continents with a small, but significant population. In contrast, Antarctica is a continent bordered by ocean, with no permanent human populations. Due to the currents and gyres around Antarctica, multi-year ice does not generally persist. In contrast, multi-year ice is a significant consideration for navigability in the Arctic (IMO, 2015). The Arctic, as an ocean, is already governed by UNCLOS, whereas Antarctica, as a continent, is not, so a new regime was needed for Antarctica.

The Antarctic system cannot be applied to the Arctic because there has never been a need in Antarctica to balance environmental protections and development interests. Non-consumptive, scientific and conservation activities drive governance in the Antarctic (Johansson & Donner, 2014). In contrast, new activity in the Arctic is being driven by potential for consumptive economic development.

Flexible and Adaptable

As a binding agreement for its signatories, the Polar Code does not leave a lot of space for flexibility and adaptability. Although not as drawn out as UNCLOS, the process of creating the Polar Code still spanned at half a decade, and will take almost a ten years since its proposal before its regulations will be implemented. This timeline doesn't allow for flexibility of change that may require responses within a shorter timeframe. The amendment process is also quite long and cumbersome, and therefore not conducive to adaptability.

C. Arctic Council

Globalization has led to the creation of new institutions dedicated to environmental governance (Lemos & Agrawal, 2006) and the existence of the Arctic Council is an example of this. The Arctic Council began in 1996 as a platform for discussing environmental issues in the Arctic. The Arctic Council was formed with the purpose of:

> promoting, co-operation, coordination and interaction among the Arctic states, with the involvement of the Arctic indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic ("Ottawa Declaration: Declaration on the establishment of the Arctic Council," 1996).

The Council promotes Arctic priorities and research through ministerial meetings, Senior Arctic Official (SAO) meetings, declarations, and working groups. The SAO meetings serve to coordinate the organizations business and purpose. Declarations are deliberative, and help publicize the working goals. The Working Groups address a wide array of subjects regarding the Arctic. Through this work, the Arctic Council has found its niche in knowledge-building (Stokke, 2012). There are six working groups under the Arctic Council: Arctic Contaminants Action Program (ACAP), Arctic Monitoring and Assessment Program (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention, Preparedness and Response (EPPR), Protection of the Marine Environment (PAME), and the Sustainable Development Working Group (SDWG) (Arctic Council, 2015). The Working Groups have an acknowledged capacity to project ideas and influence (Dodds, 2012).

The Council is a project-driven institution with specific mandates in research on environmental processes and changes in the Arctic and the promotion of best practices for activities in the region (Geiselhart, 2014). The council cannot make any formal policy decisions

as its original purpose was for cooperation and discussion. Its role and success thus far have been in identifying emerging issues and providing assessments (Young, 2012). Although more recently, legally-binding treaties have been negotiated under the auspices of the Council, including the Agreement on Cooperation in the Aeronautical and Maritime Search and Rescue in the Arctic (Geiselhart, 2014). Both Geiselhart (2014) and Young (2012) call for a more permanent infrastructure for the Arctic Council.

US Chairmanship

The foundational members of the Arctic Council are the Arctic 8, the eight nations that have territory within the Arctic Circle situated at 60°N Latitude. These are Canada, Denmark (via jurisdiction over Greenland and Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America. Cooperation between the eight Arctic nations has existed for over 20 years. Before the Arctic Council, these nations were part of the 1991 Arctic Environmental Protection Strategy (Koivurova, 2009). Koivurova (2009) is concerned that involvement by member states can be low because the of the "soft law" nature of the Arctic Council; the council was created by declaration and not a binding treaty.

The chair of the Arctic Council is a two-year duty and rotates between each of the eight Arctic Council member nations. From 2015 to 2017, the US will take over the chairmanship of the Arctic Council for the first time, with Secretary Kerry and the Department of State spearheading the US' agenda. It is in opportunity for the nation to not only elevate foreign policy issues, but also address the Arctic's role in climate change and demonstrate the US' commitment to acting on and mitigating climate change.

To demonstrate a commitment to Arctic issues, Secretary Kerry appointed Admiral Papp in the summer of 2014 as Special Representative. Commander Papp is uniquely qualified for this position because of his history with the Coast Guard (Admiral Papp, 2014)." Admiral Papp's largest concern about increasing maritime traffic is the absence of navigational safety measures to protect crew, ships, and the environment. The International Maritime Organization is developing the Polar Code to address some of these issues, which he has confidence will be a good start to improving safety. (Admiral Papp has been the head of the US delegation to the IMO in past years).

Overall, Admiral Papp has called on the need for the eight Arctic nations to work collaboratively and emerge as leaders in Arctic governance, particularly in regards to safety. This emphasis on safety echoes Admiral Papp's background in safety and environmental management at the USCG (Admiral Papp, 2014).

Evaluation based on Governance Criteria

Situated in a Globalized World

The Arctic Council develops linkages between nations interested in the resources of the Arctic. In its inclusion of states beyond those adjacent to the Arctic, the Arctic Council has recognized its role in the globalized world.

Appropriate for the Local Context

Of the governance regimes analyzed, the Arctic Council is the only entity focused entirely on local, Arctic issues. The Arctic has been the sole focus since the creation of the Council by the Ottawa Declaration (1996).

Inclusive of Non-State Actors

The Arctic Council actively incorporates diverse stakeholders through participant and observer statuses.

There are six permanent participants of the Arctic Council who represent interests of local indigenous communities. They are the Arctic Athabaskan Council (AAC), Aleut International Association (AIA), Gwich'in Council International (GCI), Inuit Circumpolar Council (ICC), Russian Association of Indigenous Peoples of the North (RAIPON), and the Saami Council (SC). The member states need to consult with permanent participants before decisions are made, solidifying the role of indigenous communities in Arctic governance decisions (Koivurova, 2009).

As of the end of 2014, there were 32 permanent observers[3] to the Arctic Council. These observers represent non-Arctic nation-states, multilateral bodies, educational institutions, and

[3] Full List of Permanent Observers as of 2015:
Non-Arctic Nations: France, Germany, The Netherlands, Poland, Spain, United Kingdom, People's Republic of China, Italian Republic, State of Japan, Republic of Korea, Republic of Singapore, and the Republic of India.
Intergovernmental and Inter-Parliamentary Organizations: International Federation of Red Cross & Red Crescent Societies (IFRC), International Union for the Conservation of Nature

nongovernmental organizations, but do not include representatives of industry (Arctic Council, 2015). These non-Arctic nations, including Japan, the Republic of Korea, and Singapore, are economically driven by the potential for maritime transportation in the Arctic. Ports in Korea and Singapore are major transportation centers that could be hub ports for transit in the Arctic. Korea also has the second largest ship building industry, specializing in LNG and icebreakers, two types of vessels that are increasingly in demand with growing activities in the Arctic (*Arctic 2014: Who Gets a Voice and Why it Matters*). These nations are also investing in their own icebreakers so that they can take advantage of Arctic routes.

There are transportation interest beyond the eight member nations of the Arctic Council (Ho, 2010). Although the Arctic 8 are hesitant to increase participation in the Arctic Council to non-Arctic nations, they recognize the importance of avoiding other nations creating their own, competing, Arctic governance regime (*Arctic 2014: Who Gets a Voice and Why it Matters*). Permanent observer nations of the Arctic Council, specifically those with interests in the resources of the Arctic should be involved in the management of the region (Geiselhart, 2014). Outside interests (non-Arctic nations) should not come to dominate Arctic management, yet theses stakeholders cannot be ignored (Young, 2012).

Produce Knowledge

The Council produces a discourse around environmental change and governance in the Arctic, portraying itself as an effective agent and reputable body to address such issues (Dodds, 2012). The Arctic Council's niche is in producing technical recommendations and influential scientific assessments (Koivurova, 2009). Although the Council successfully produces technical information via its working groups, a critique of this is that the groups function independently of

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(IUCN), Nordic Council of Ministers (NCM), Nordic Environment Finance Corporation (NEFCO), North Atlantic Marine Mammal Commission (NAMMCO), Standing Committee of the Parliamentarians of the Arctic Region (SCPAR), United Nations Economic Commission for Europe (UN-ECE), United Nations Development Program (UNDP), and the United Nations Environment Program (UNEP).

Non-governmental organizations: Advisory Committee on Protection of the Seas (ACOPS), Arctic Institute of North America (AINA), Association of World Reindeer Herders (AWRH), Circumpolar Conservation Union (CCU), International Arctic Science Committee (IASC), International Arctic Social Sciences Association (IASSA), International Union for Circumpolar Health (IUCH), International Work Group for Indigenous Affairs (IWGIA), Northern Forum (NF), University of the Arctic (UArctic) and the World Wide Fund for Nature – Global Arctic Program (WWF).

each other and therefore it is difficult for the Council as a whole to address the interrelations between problems assessed (Johansson & Donner, 2014).

Provide Sufficient Infrastructure, including capacity for enforcement

Because the Council cannot make policy, it does not have the resources or the authority to develop physical infrastructure in the Arctic, although it may advise other actors in its creation.

Environmental Protections

Although the Arctic Council was created as a platform for discussing environmental issues in the Arctic, because the Council cannot mandate policy it cannot actively ensure environmental protections in the region. Indirectly, the reports of its working groups can inform other institutions in the policy formulation process. Thus far, these reports have been successful in identifying environmental threats and recommending guidelines for a remedial course of action for its members (Johansson & Donner, 2014). Much of the environmental protections and conservation in the Arctic is promoted by international NGOs (Arctic Council, 2009).

Flexible and Adaptable

A benefit of the Arctic Council is that it is classified as "soft law," which allows for greater flexibility in its priorities (Johansson & Donner, 2014). There is nothing inevitable about the focus and scope of the Arctic Council. Dodds (2012) describes the Council as a "forward-facing organization," one designed to address emerging challenges. To do so, the Arctic Council strives for an adaptable rule-making strategy that can allow for amendments (Johansson & Donner, 2014).

D. Domestic Legal Regimes and Capacity of Arctic Nations

Although there are eight distinct nations whose national regimes impact Arctic transportation activities, this paper selectively addresses the United States and the Russian Federation as their regimes fall on opposite ends of the capacity spectrum in the Arctic.

United States

The US has explicitly stated the strategic importance of the Arctic region for the nation. Its management of Arctic activities is spread across various agencies, but increasingly centralized in the State Department as interest grows (Geiselhart, 2014). The United States has very limited capacity in the Arctic, and management is falling behind the dramatic changes

occurring in the Arctic (Ebinger et al., 2014). The USCG has only two outdated icebreakers and does not have the capability to respond to events in the Arctic (*Arctic 2014: Who Gets a Voice and Why it Matters*).

Russian Federation

For Russians, the NSR has a connotation of being a "grand national transport corridor" for the purpose of producing natural resources and transporting goods to communities in the Russian Arctic (Johansson & Donner, 2014). In the Cold War period, the Arctic was seen as a potential hotspot for conflict between the USSR and the US because it was the closest point between the two warring nations (Koivurova, 2009).

Russia has successfully implemented considerable transit regulations in the Arctic by using UNCLOS Article 234 as justification. All vessels intending to use the NSR must give notice to the Russian government by submitting an application and an "ice-breaker fee" for guidance by Russian vessels during transit. Other nations have not challenged Russia's claims over these waters and have accepted them by complying with the regulations (Johansson & Donner, 2014). Russia is increasing its capacity for active management in the Arctic by investing in port installations, oil and coal terminals (Geiselhart, 2014). The development of this infrastructure is ensuring that Russia will be an integral part of safety management throughout the Arctic (*Arctic 2014: Who Gets a Voice and Why it Matters*). Shipowners have indicated that they preferred the NSR because of existing infrastructure and systems of transit (Lasserre & Pelletier, 2011), which made the passage more secure.

Evaluation based on Governance Criteria

Situated in a Globalized World

These domestic regimes primarily manage activities occurring in their own waters, but this management facilitates smooth global maritime transportation across the world.

Appropriate for the Local Context

Although both nations locally manage extensive maritime areas in the Arctic, most management is done through existing international and national legislation. Very little to no legislation has been created by these two nations specifically targeting activities in the Arctic. For example, Russia manages parts of the Arctic under preexisting national legislation like the "Water Code of the Russian Federation." US laws, which intersect with Arctic management,

include the "Coastal Zone Management Act" as prescribed in Alaska and the Oil Pollution Act of 1990 (Johansson & Donner, 2014).

Inclusive of Non-State Actors

Government officials set all strategy and policy on the federal level.

Produce Knowledge

National regimes do not produce knowledge to fill the "infrastructure deficit," but could encourage local universities and scientific institutions to do so through grants and other support.

Provide Sufficient Infrastructure, including capacity for enforcement

The actions of the Russian Federation have shown that Arctic nations are capable of enforcing jurisdictional and environmental regulations and have the capacity to provide emergency infrastructure as needed. The US is lacking in capacity for enforcement or emergency response. A study by the US Coast Guard indicated that the US should commission the construction of six new icebreakers to achieve appropriate involvement in the Arctic and Antarctic. The US' current fleet is limited and old. In contrast, Russia has 40 icebreakers with more scheduled to be constructed (LaGrone, 2015).

Environmental Protections

Because the Russian Federation manages its Arctic territory under Article 234, it is able to implement and enforce much stricter environmental regulations, including prohibitions on certain harmful discharges (Johansson & Donner, 2014).

Flexible and Adaptable

Overall, these actions of nations are not very flexible as they are embedded in larger national regulations that take a lot of effort to change. In the US, there is no political will to do so. There is slightly flexibility in that nations can quickly mobilize significant resources in response to any sort of disaster.

E. Self-Regulation by Private Industry

There is an increasing importance of cross-scale governance and market instruments (Lemos & Agrawal, 2006). Shipowners, insurers, and trade associations can drive maritime governance; often regulations will start out as industry practices before being adopted internationally (Arctic Council, 2009).

Insurers play a significant role in dictating what practices maritime transportation companies will follow in the Arctic. Lloyds of London, a major international insurer, has developed sailing guidelines for the Arctic in response to the Polar Code. Lloyds felt the Polar Code lacked clarity, which could lead to variations among national interpretations of the IMO guidelines. It is very difficult to get reliable data from the Arctic, which is a challenge for insurance companies when calculating risk (Mangset, 2014). The pioneering transit of the coal carrier, *Nordic Orion*, almost did not occur due to reluctance of insurers to insure the voyage in September 2013 (Stueck, 2013).

Corporate social responsibility (CSR) is a form of market-based, self-governance that depends on the actions of industry being tied to consumer preferences, specifically for environmentally conscious goods and services (Lemos & Agrawal, 2006). CSR is appropriate in the context of the Arctic governance because both governance in the Arctic and CSR emphasize the linkage between growing activity in the region and the need to manage the potential for environmental damage. The foundation of CSR is that a business is accountable to its stakeholders and therefore businesses have a responsibility to conduct their activities in a way the stakeholders would approve (Johansson & Donner, 2014). Environmentally responsible actions by shipping companies in the Arctic are less obvious than terrestrial CSR practices because maritime transportation is already heavily regulated by national and international standards, such as those set by the IMO.

The World Ocean Council (WOC), an international organization with the aim of increasing business input in sustainable oceans management, has convened meetings with the purpose of discussing industry interests in the Arctic region. In 2012, the WOC convened the Arctic Business Leadership Council Meeting to address the deficiency of industry involvement in Arctic governance processes (World Ocean Council, 2012). The purpose of this meeting was to gauge the potential for creating an Arctic Business Leadership Council that would facilitate interaction among industry representatives with an interest in the Arctic. The meeting highlighted that industries in the Arctic have a commitment to operating sustainably, but were concerned about negative public perception of industry activities in the Arctic. Business representatives also highlighted the obstacles created by a lack of environmental data and harmonization across jurisdictional standards. While this meeting did not create new governance structures, it highlighted the concerns and suggestions for the role of the business community in

the Arctic, and presented these notes to the Sustainable Development Working Group of the Arctic Council (World Ocean Council, 2012).

Evaluation based on Governance Criteria

Situated in a Globalized World

Self-regulation or CSR works within a company that operates internationally, but this may lead to discrepancies among practices across transportation companies.

Appropriate for the Local Context

Industry is looking to fill gaps in local governance by self-organizing via forums like the WOC Arctic Business Leadership Council or developing their own more stringent rules like those put forth by Lloyds.

Inclusive of Non-State Actors

This is a form of governance dominated by non-state actors. Maritime transportation industries should also be cognizant of the role of indigenous groups, as indigenous lives will be impacted by transportation activities in the Arctic (Eamer et al., 2013).

Produce Knowledge

Industry contributes significant technical knowledge, management and practical feasibility (Arctic Council, 2009). The WOC Arctic Business Leadership Council meeting highlighted the need for greater collaboration between industry and government so that governments understood the infrastructural needs that would ensure safe and sustainable activities in the region (World Ocean Council, 2012).

Provide Sufficient Infrastructure, including capacity for enforcement

If private actors are interested in taking advantage of Arctic routes sooner, they could contribute capital and/or resources to the development of increased infrastructure in the Arctic, including funding icebreaker construction or bathymetric surveys. As private actors, industry does not have the authority for enforcement.

Environmental Protections

Self-governance enables private actors to enforce potentially greater environmental standards, but the lack of uniformity across businesses impairs the overall strength of the protections. A concern regarding the role of private industry is that actors who have greater access to resource and expertise are likely to receive greater benefits. The fear is that if private

actors become more influential in the process, those responsible for the environmental degradation will then be those same actors setting the policy agenda (Lemos & Agrawal, 2006).

Flexible and Adaptable

Private-based governance is significantly more flexible than binding national or international treaties because they are not constrained to functioning on the slow timescales of state-driven management. Similarly, business and industry have the capital to be innovative with their actions in a way the government does not have capacity to be.

VII. Evaluating Arctic Governance: Successes and Gaps

Current governance in the Arctic exists across multiple scales and levels, across binding and voluntary agreements, and public and private actors. While Arctic institutions successfully contribute to global environmental governance in the region, there are still gaps that exist across institutions and an overall lack of synthesis between institutions (Johansson & Donner, 2014). The evaluation of the existing governance institutions based on ideal characteristics of global environmental governance is summarized in Table 2. Each of the Arctic institutions is fulfilling at least one of the governance characteristics, indicating that existing governance institutions successfully contribute to overall governance in the region.

A networked form of governance in the Arctic would fill these gaps and bridge successful qualities of each of the Arctic institutions. Based on an evaluation of recommendations for Arctic governance regimes proposed by scholars, I suggest that an expansion of the role of the Arctic Council would facilitate networked governance in the Arctic.

Table 2: Summary of successes and gaps in Arctic governance among existing governance regimes.

Characteristic	UNCLOS	IMO	Arctic Council	National Regimes	Industry
Situated in a Globalized World					
Appropriate for Local Context		Polar Code			
Inclusive of Non-State Actors		through member states and via consultative status of IGOs and NGOs	as an observer or through nation-states, increased definition of observers	varies among Arctic nations	varies among Arctic nations
Knowledge Production					
Adequate Infrastructure				depends on the nation	
Environmental Protections	Article 192, prescriptive. Some enforcement through Article 21	Good internationally, but relatively weak in the Arctic	weak, but not nonexistant	depends on priorities of the nation	uneven across companies
Flexible and Adaptable		IMO as a whole generally flexible, the Polar Code is not as a binding agreement.			has the capacity to be innovative

Successful
Gap
Partially, or has the potential to be succesful

A. Bridging the Gaps: Networked Governance in the Arctic

Environmental problems are distributed across many spatial, sociopolitical, and temporal scales. The interconnectedness of environmental systems requires holistic governance and spans multiple agencies, yet historically, policy has evolved to address discrete problems (Haas, 2004). Networked governance is intended to counteract siloed, sectoral institutions and create an environment of governance that is conducive to cooperation and compromise (Lemos & Agrawal, 2006).

A networked form of governance, where institutions work together to form a network of governing institutions, requires involved actors to consider how their actions will influence the other governance stakeholders (Haas, 2004). Networked global governance is the appropriate regime structure to incorporate all the principles of global environmental governance identified in Section IV and apply them in the Arctic. This governance model recognizes existing governance bodies and streamlines and improves their performance (Haas, 2004). An Arctic Regime Complex would be the implementation of networked governance in the region. Young (2012) describes a regime complex as "an array of partially overlapping and nonhierarchical institutions governing a particular issues-area." The array of institutions in the Arctic already includes UNCLOS, the IMO, the Arctic Council, national regimes, and private industry. Networked governance is a combination of multilevel, niche, and hybrid forms of governance.

B. Multilevel and Niche Governance

Multilevel governance is defined as "a system of continuous negotiation among nested governments at several territorial tiers – 'supranatural, national, regional and local.' (Roe, 2007)." The concept of multilevel governance combines well with a niche oriented approach to governance where each institution within the nested governance specializes in a task of governance, for example, capacity building or rule enforcement (Stokke, 2012). A niche approach is distinctive from siloed governance because niche approaches divide institutions by general governance tasks (eg. capacity building, knowledge acquisition, communication) whereas siloed governance divides institutions by sector (eg. fisheries, shipping, energy).

Multilevel governance is the middle road between one fully integrated governance structure (like a legally binding agreement) and siloed management schemes (Young, 2012). To have an effective network of governance institutions, it is imperative to define the division of

labor among actors, identifying the comparative advantage of each institution (Haas, 2004). For example, the release of pertinent environmental information related to climate change by one actor may influence the regulations of another actor. In another example, the Arctic Council is well situated to focus on support to the IMO by enhancing local maritime infrastructure (Stokke, 2012).

In multilevel governance, each jurisdictional layer is responsible for policies relevant to that layer of the industry. Roe (2007) divides multilevel governance into two categories; Type I only allows for one well-defined institution per jurisdictional layer with minimal overlap of responsibilities whereas Type II encourages niche-based institutions that may overlap in jurisdictional layers. Roe (2007) contends that the latter type is more conducive to the maritime transportation industry because it situates governance in a globalized world. Hierarchical, Type I governance in the transportation industry may have in fact led to a failure of policy where top-down policies were improperly translated to local implementation.

Lemos and Agrawal (2006) describe multilevel governance to be superior at a) integrating scientific, technological, and lay knowledge, b) providing sufficient flexibility, c) involving multiple actors, d) aptly integrating state and non-state actors and recognizing their importance of equal involvement, and e) working across scales, among others traits (Lemos & Agrawal, 2006; Roe, 2007). These superior characteristics are parallel to many of the identified principles of global environmental governance (Section IV). Multilevel, networked governance fosters less formal communication and greater transparency (Lemos & Agrawal, 2006). Young (2012) advocates the development of an Arctic regime that is flexible across issues and adaptable across time.

C. Hybrid Governance

Hybrid environmental governance is becoming more common as "pure" forms of government (market-, state-, civil society-based governance) are coming to depend on other systems of governance (Figure 7). The potential success of hybrid governance is that one institution in the regime complex can fill the shortcomings of other bodies in the governance regime. Centralized governments are coming to depend on local administrations and organizations to complement regional management efforts as they realize no one actor is capable of addressing all complex and multi-scale facets of environmental problems (Lemos & Agrawal,

2006). Haas (2004) considers slight redundancy within responsibilities of governance partners to be a good quality because it provides "insurance" against the possible decline or failure of another partner. Partner institutions in hybrid regimes also serve as checks and balances on the other actors in the regime (Lemos & Agrawal, 2006).

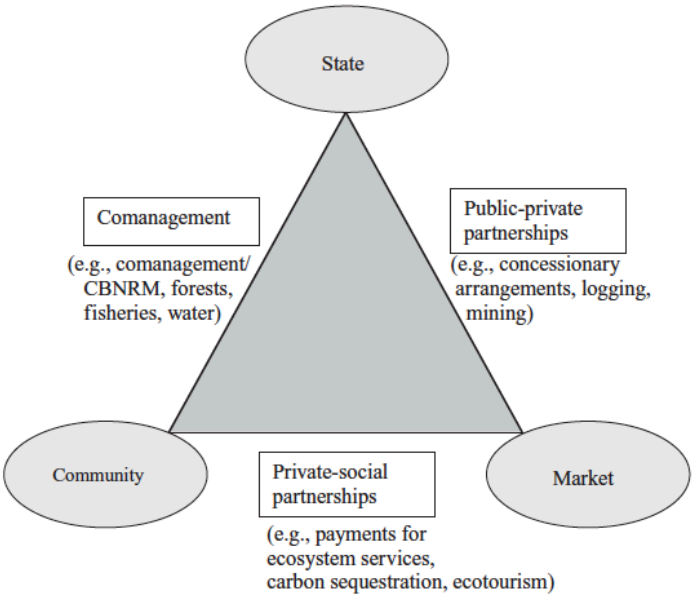

Figure 7: Mechanisms of environmental governance. Strategies in the boxes represent opportunities for hybrid forms of governance. (Figure 1 in Lemos & Agrawal (2006))

In the Arctic, potential private-public partnerships in governing the maritime transportation sector are an opportunity for the hybridization of governance. An increase in private-public or private-social partnerships between the maritime transportation industry and governments, local communities, or other stakeholders can alter some of the industry "gaps" in Table 2 to "successes" or "partial successes." For example, Petro-Nav, a bulk fuel shipping company, and Fednav, a dry-bulk shipping company, are two entities active in the Arctic that engage regularly with local communities when planning for Arctic operations. In Deception Bay, Fednav vessels maintain a single ship-width track to minimize the disruption of natural ice cover. In return, local residents provide real time information on ice conditions in areas of ship operations. In the Northern Labrador, ship tracks have been defined by agreement between the business and local residents; this ensures that residents are still able to utilize sea-ice transportation routes (PAME, 2014). This partnership between transportation companies and local communities led to a reliable flow of communication between stakeholders and minimized conflict between user groups.

Non-state actors can contribute innovative tools to the policy process by providing capital and/or capacity which state actors do not posses. A Petro-Nav oil spill training drill that involved working closely with local stakeholders identified significant resources of local governance to respond to a potential spill from a vessel (PAME, 2014). The lack of adequate Arctic capacity of Arctic nations to respond to environmental disasters in the region shows potential for an

increased role of local communities to serve as focal points for disaster response. Building private-public partnerships related to environmental protections could help ameliorate some of the infrastructure deficit the Arctic faces.

D. Formalizing Networked Governance in the Arctic

To ensure greater cohesiveness among Arctic institutions, of the various governance regimes proposed by Arctic scholars, I argue for the expansion of the Arctic Council to serve as an intermediary between existing institutions and to identify and actively fill governance gaps to facilitate a networked governance regime. This expansion of the Arctic Council could be the focus of a new Working Group or Secretariat of the Arctic Council. While we see successful examples of hybridization and multilevel governance working along the sides of the triangle (Figure 8), a formal body would ensure that networked governance occurs smoothly within the triangle. This third party institution needs to ensure equal representation of stakeholders between nations, civil society, and industry.

The Arctic Council would be an appropriate entity to serve as an intermediary because they have already established themselves as a successful regional governance institution. Of the types of governance evaluated, the Arctic Council was the institution with the greatest number of successes in principles of global environmental governance (four of the seven principles were categorized as successes), followed by partial or potential successes in the remaining two principles (Table 2). The Arctic Council has already demonstrated success in engaging various participants; CAFF's Arctic Biodiversity Assessment was an example of successful bridging of different stakeholder (national, NGOs) working towards a common goal. This would not require additional management and policy formulation capacity on behalf of the Arctic Council, but rather the ability to initiate policy creation and delegate governance tasks to the other existing Arctic institutions as appropriate.

If Young's (2012) regime complex were to be implemented in the Arctic, not every agency would be fully equipped to respond to all problems; instead institutions would specialize in one of the tasks of Arctic governance. Existing institutions may have the capacity to successfully implement certain governance tasks (Stokke, 2012). To ensure that this complex works smoothly and cohesively, there needs to be strong and effective communication among institutions, which the new arm of the Arctic Council could facilitate. A greater emphasis on

communications in governance among nations and management agencies will ensure complementary practices among stakeholders. Establishing standard modes of communication would ensure transparency and that best practices are followed and promulgated (Geiselhart, 2014).

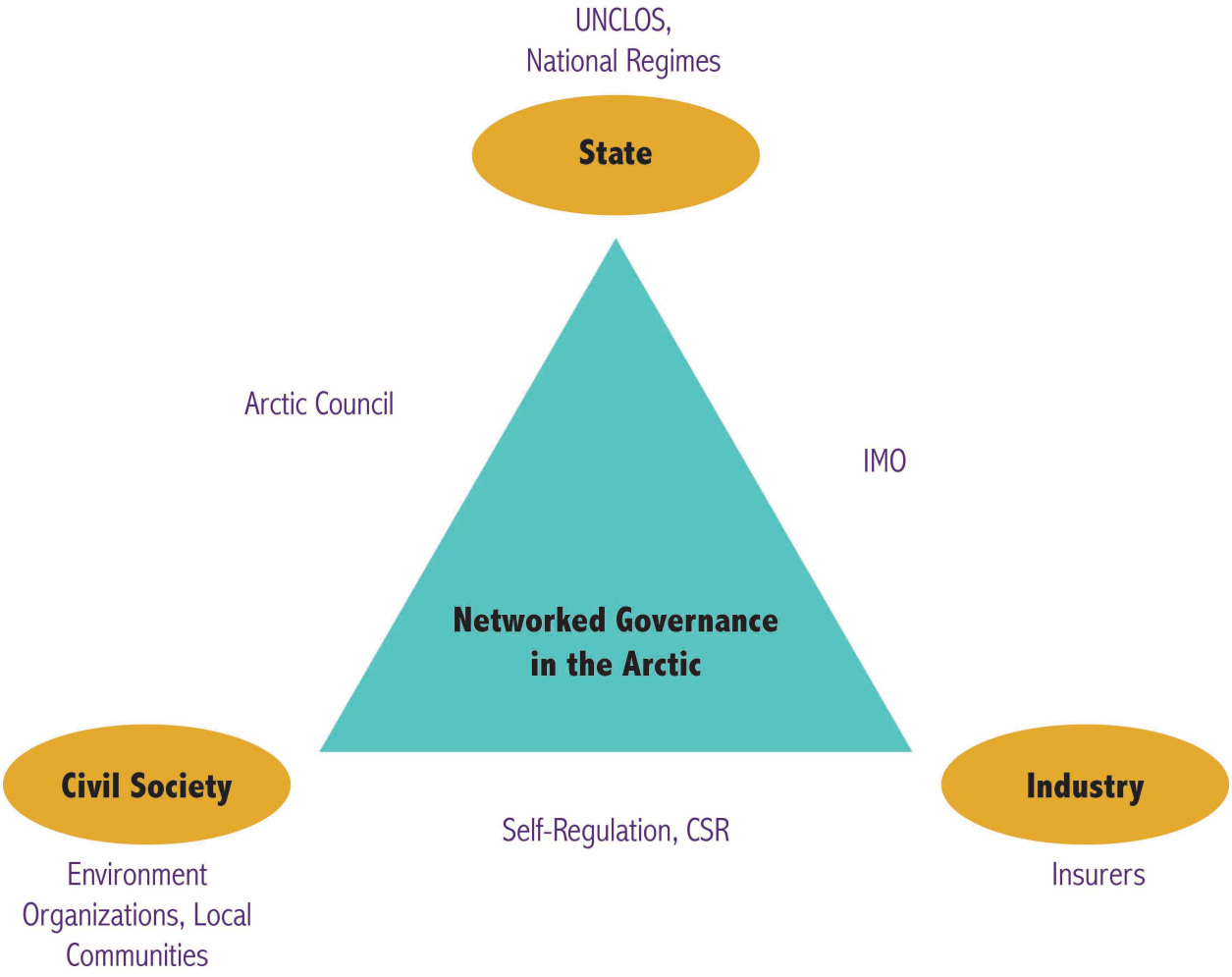

Figure 8: Networked governance in the Arctic. Adapted from Figure 1 in Lemos & Agrawal (2006).

In contrast, Ho (2010) proposes that an integrated governance and regulatory framework based on UNCLOS is needed is the Arctic, yet a comprehensive, legally binding agreement along the lines of UNCLOS is contradictory to the growing understanding of environmental governance. The best design for environmental management is a loose, decentralized regime because they are flexible (Haas, 2004). Young (2012) similarly argues that a binding Arctic Treaty is not desirable because the process to create a legally binding document would be long and drawn out, similar to the Law of the Sea process. The resulting document would also be

duplicative of UNCLOS and inflexible, and many authors strongly believe that flexibility and adaptability in Arctic governance is essential to respond to the dynamic environment (Haas, 2004; Young, 2012). If an agreement is achieved, success tends to be limited because international binding agreements tend to lack adequate enforcement (Lemos & Agrawal, 2006).

A Regional Seas Agreement under UNEP has also been suggested as a potential governance structure for the Arctic. A Regional Seas Agreement is a cooperative international framework with the purpose of sustainably managing the world's oceans (UNEP, 2015). Many of them exist around the globe, including some in the polar-adjacent regions like the North Atlantic and Baltic. As most agreements are composed of regional nations, an Arctic Regional Seas Agreement would have to be creative about including non-Arctic nations in the collaborative management of the Arctic Ocean. It is also possible for a Regional Seas Agreement to exist under the Arctic Council, but is limited in that the Council does not have a legal personality. The legal personality of an institution is the ability to conclude legal agreements and bring legal claims against other actors in international law (Duyck, 2014).

Conclusion

The shared zone has now become the rule rather than the exception. (Allott, 1992)

Allot (1992) presents this idea of *mare nostrum* where all waters should be considered as "an area of power and interest shared by two or more state systems." Nowhere is *mare nostrum* more obvious than in the emerging governance in the Arctic; multiple institutions on international, regional, and national levels govern overlapping spatial and sectoral regions of the Arctic. This "complicated mosaic" (Arctic Council, 2009) of governance in the Arctic demonstrates a need for greater synthesis between governing institutions in the Arctic.

The Arctic has functioned and has the potential to continue to be a platform for international cooperation. Growing maritime transportation activities in the Arctic will face opportunities and threats associated with the environmental, political, and socioeconomic conditions unique to the region. Responding to threats in the Arctic will take collaboration among all Arctic nations, non-Arctic nations, and industries that have vested interests in the economic potential of the region (*Arctic 2014: Who Gets a Voice and Why it Matters*).

Existing institutions successfully address certain principles of global environmental governance in the Arctic, yet there is still significant room for improvement. A networked governance regime facilitate by a new arm of the Arctic Council could ensure greater collaboration and synthesis among actors. Implementing a networked governance regime in the Arctic provides the opportunity to leverage successful governing institutions, while recognizing gaps and developing methods to fill them.

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